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| 09/919,186      | 07/30/2001  | David R. Tarditi     | MS137774.1/40062.127US01 | 2620             |

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| EXAMINER |
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EHICHIOYA, FRED I

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| ART UNIT | PAPER NUMBER |
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2172

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DATE MAILED: 10/06/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/919,186

Applicant(s)

TARDITI, DAVID R.

Examiner

Fred I. Ehichioya

Art Unit

2172

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1 - 33 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1 - 33 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

**DETAILED ACTION**

1. Claims 1 – 33 are pending in this office action.

***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1 – 5, 11 – 15, 16 – 18, 24, 26, 29, 30, 31 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 6,308,319 issued to William Bush et al (hereinafter "Bush") in view of U.S. Patent 6,185,581 issued to Alexander T. Garthwaite (hereinafter "Garthwaite").

Regarding claims 1, 11, 14, 24, 29 and 31, Bush a computer program product encoding a computer program for executing on a computer system a computer process for building compact garbage collection tables adapted for use in reclaiming memory from a heap during runtime, the computer process comprising:

generating a first call site table storing call site identifiers (see column 4, lines 48 – 57);

generating a final descriptor table storing a set of unique descriptors, at least one unique descriptor describing a location of a pointer into the heap (see Fig.1 and column 4, lines 18 – 25); and

Bush does not explicitly teach generating a descriptor reference table associated with the first call site table, each entry in the descriptor reference table mapping a call site identifier in the first call site table to one of the unique descriptors in the final descriptor table.

Garthwaite teaches generating a descriptor reference table associated with the first call site table, each entry in the descriptor reference table mapping a call site identifier in the first call site table to one of the unique descriptors in the final descriptor table (see column Fig.6; column 7, lines 16 – 25 and column 14, lines 63 – 67).

It would have been obvious to one of ordinary skills in the art at the time the invention was made to combine the teachings of Garthwaite with the teaching of Bush for descriptor table to include summary of its associated references to call site table. This enables the Garbage collector to consider which object is reachable and unreachable. As a result garbage collector is able to clear unusable memory.

Regarding claims 2, 12 and 15, Garthwaite teaches wherein at least two call site identifiers are mapped to the same unique descriptor in the final descriptor table (see column 6, lines 60 – 65 and column 12, lines 6 – 12).

Regarding claims 3, 13, 16, 26, 30 and 33, Garthwaite teaches the final descriptor table contains no identical descriptors (see column 12, lines 43 – 46).

Regarding claim 4 and 17, Garthwaite teaches the operation of generating a first call site table comprises: storing return addresses for one or more call sites into the call site table (see Fig.17a steps 180, 182, 184 and column 16, lines 5 – 32).

Regarding claims 5 and 18, Garthwaite teaches the operation of generating a final descriptor table comprises:

generating an initial descriptor table including at least two identical descriptors, each descriptor in the initial descriptor table corresponding with a call site identifier in the call site table (see column 12, lines 6 – 12);

copying each descriptor from the initial descriptor table to the final descriptor table, if the descriptor is not identical to another descriptor already copied to the final descriptor table (see column 12, lines 38 – 46).

3. Claims 6 – 10, 19 –23, 25, 27, 28 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bush in view Garthwaite in further in view of U.S. Patent 5,848,423 issued to Zahir Ebrahim et al (hereinafter “Ebrahim”).

Regarding claims 6 and 19, Bush teaches the operation of generating a descriptor reference table comprises:

generating a table pair including a second call site table and an initial descriptor table, the initial descriptor table storing descriptors that include at least two identical descriptors (see column 5, lines 53 - 60);

sorting the table pair based on the descriptors in the initial descriptor table to provide a sorted table pair (see column 4, lines 18 – 28);

Bush or Garthwaite does not explicitly teach traversing sequentially through the descriptors in the sorted table pair to associate a reference to each call site in the second call site table, the reference being modified when a unique descriptor is encountered in the initial descriptor table;

identifying each call site identifier in the second call site table to which each reference is associated; and storing each reference into the descriptor reference table in association with the call site identifier identified in the identifying operation.

However, Ebrahim teaches traversing sequentially through the descriptors in the sorted table pair to associate a reference to each call site in the second call site table, the reference being modified when a unique descriptor is encountered in the initial descriptor table (see column 4, lines 63 – 66);

identifying each call site identifier in the second call site table to which each reference is associated; and storing each reference into the descriptor reference table in association with the call site identifier identified in the identifying operation (see column 3, lines 40 – 42).

It would have been obvious to one of ordinary skills in the art at the time the invention was made to combine the teachings of Garthwaite and Ebrahim with the teaching of Bush for descriptor table to include summary of its associated references to call site table. This enables the Garbage collector to consider which object is reachable and unreachable. As a result garbage collector is able to clear unusable memory.

Regarding claims 7 and 20, Bush teaches the reference is an ordinal identifier of unique descriptors being processed during the traversing operation (see column 3, lines 47 – 50).

Regarding claims 8 and 21, Garthwaite teaches the traversing operation comprises: incrementing the ordinal identifier when a unique descriptor is encountered in the initial descriptor table (see column 15, lines 28 – 32).

Regarding claims 9, 22 and 28, Ebrahim teaches the reference includes a pointer one of the unique descriptors stored in the final descriptor table (see column 5, lines 41 – 44 and column 13, lines 4 – 11).

Regarding claims 10 and 23, Garthwaite teaches the traversing operation comprises:

designating as the reference a new pointer to one of the unique descriptors in the final descriptor table when a unique descriptor is encountered in the initial descriptor table (see column 10, lines 40 – 46).

Regarding claims 25 and 32, Ebrahim teaches the descriptor is mapped to at least two call site identifiers in the call site table (see column 13, lines 1 – 3).

Regarding claim 27, Ebrahim teaches the descriptor reference includes an index into the descriptor table (see column 9, lines 15 – 23).




**Conclusion**

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Fred I. Ehichioya whose telephone number is 703-305-8039. The examiner can normally be reached on M - F 8:00 AM to 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kim Y. Vu can be reached on 703-305-4393. The fax phone numbers for the organization where this application or proceeding is assigned are 703-746-7239 for regular communications and 703-746-7238 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-303-3900.

Fred Ehichioya  
October 1, 2003

  
SHAHID ALAM  
PRIMARY EXAMINER